DOCUMENT RESUME

ED 215 305 CS 006 599

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TITLE The Emergence of the Literal-Metaphorical-Anomalous Distinction in Young Children.
INSTITUTION Bolt, Beranek and Newman, Inc., Cambridge, Mass.; Illinois Univ., Urbana. Center for the Study of Reading.
SPONS AGENCY National Academy of Education, Washington, D.C.; National Inst. of Education (ED), Washington, DC.
REPORT NO CSR-TR-228
PUB DATE Feb 82
CONTRACT 400-76-0116
NOTE 26p.

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS *Child Development; *Cognitive Processes; *Language Acquisition; *Language Processing; Language Skills; *Metaphors; Preschool Education; Reading Comprehension; *Reading Research
IDENTIFIERS Reading Strategies

ABSTRACT

A study investigated children's ability to distinguish among literal, metaphorical, and anomalous comparisons. The 100 subjects, equal numbers of three-, four-, five-, and six-year-old children and college students, completed similarity statements by choosing one of two words from (1) a metaphorical/literal word pair, (2) a literal/anomalous word pair, and (3) a metaphorical/anomalous word pair. Selections were also made in a categorization task. The results suggested that even the youngest children could distinguish meaningful comparisons from anomalous ones. It appeared that four-year-old and older children were aware that the terms from the metaphorical comparisons, unlike the literal ones, belonged to different conventional categories. These results were interpreted as indicating that as early as four years of age children have some rudimentary metaphorical competence. (Author/RL)

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CENTER FOR THE STUDY OF READING

Technical Report No. 228

THE EMERGENCE OF THE LITERAL-METAPHORICAL-ANOMALOUS DISTINCTION IN YOUNG CHILDREN

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This research was supported in part by the National Institute of Education under Contract No. HEW-NIE-C-400-76-0116, and in part by a Spencer Fellowship awarded to the second author by the National Academy of Education. We wish to thank the children, teachers and principals of the Children's Learning Center, the Montessori School, and Washington School, all of Champaign, Illinois. We also wish to thank Larry Shirey and Paul Wilson for help in running subjects, Carolyn Mervis for help in the early stages of the work, and Sam Glucksberg, Susan Sugarman, and Rich Vondruska for their comments on an earlier draft of this paper.

CS206599

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The Emergence of the Literal-Metaphorical-Anomalous Distinction in Young Children

Many investigators of metaphor would agree that the production and comprehension of metaphor involves the recognition of some novel similarity between concepts that belong to different conventional categories. Thus, when we credit a child with producing or understanding a metaphor as a nonliteral use of language, we are tacitly assuming that the child in fact has the conventional categories that are supposed to be violated by the comparison involved in the metaphor.

Take for example the case of a young child who during play calls a green carpet "grass" (Billow, in press). Some investigators of metaphor, like Billow (in press) and Winner, McCarhty, Kleiman and Gardner (in press, Winner, McCarhty & Gardner, 1980), argue that if the use of "grass" in this context is not an overextension caused by lack of knowledge of the word "carpet," but is a "renaming" (Winner, et al., in press), then it involves a deliberate violation of conventional category boundaries. This in turn is thought to justify calling such productions metaphors.

Others, (e.g., Piaget, 1962), argue that such utterances may be based on the perception of some similarity between the objects being compared, but refrain from calling them metaphors. Piaget (1962) calls them "verbal schemas" and "preconcepts" that are "intermediary between the schemas of sensory motor intelligence and conceptual schemas . . ." (p. 218). According to Piaget, the child needs to have the hierarchical ordering of classes and the complete comprehension of class inclusion relations characteristic of the concrete operational stage before he or she can be

credited with the ability to categorize. It follows from this that the production and comprehension of metaphors as figurative devices must await the later stages of concrete operations (see, for example, Cometa & Eson, 1978).

In our opinion both of these positions are too extreme. For example, it is by no means clear that renaming is necessarily metaphorical in nature. If, in calling a green carpet "grass" the child is merely noticing an (interesting) similarity of color and texture, this hardly seems sufficient to justify calling the production metaphorical. Nor is it enough to know that the child knows the word for carpet. Rather, what seems to be needed is that the child also knows that carpets and grass belong to different conventional categories.

The issue, of course, all hinges on what one means by calling a production a metaphor. Our view is that there are several criteria, each adding to the quality and depth of a metaphor. A necessary condition for a statement to be considered metaphorical is that it is based on a meaningful comparison between terms drawn from different conventional categories, although, as Sternberg and his collaborators (e.g., Sternberg, Tourangeau & Nigro, 1979; Tourangeau & Sternberg, in press) have noted, the less remote these categories are, the less metaphorical is the comparison. Another criterion--one that usually characterizes adult metaphors but, as we will later argue, is rarely present in child metaphors--is that the respects in which the two things are alike are differentially important or central to the two terms. Ortony (1979) refers to these two sources of metaphoricity as <u>domain incongruence</u> and <u>salience imbalance</u> respectively. The claim is

that if two terms come from different domains they cannot be literally similar because they are different kinds of things. However, comparisons between such terms are not necessarily meaningless. Thus, there seem to be three kinds of similarity statements: (a) There are literal similarity statements such as A river is like a lake. These are cases in which there are discernible nontrivial similarities between objects belonging to the same category. (b) There are nonliteral similarity statements such as A river is like a snake. These are cases in which there are discernible nontrivial similarities between objects belonging to different conventional categories. We shall sometimes refer to such statements as metaphorical comparisons. Finally, (c) there are anomalous similarity statements such as A river is like a cat, in which the compared terms come from different categories but where there are no discernible nontrivial similarities.

If metaphors are defined in terms of nonliteral similarity, then we need to know whether the child who is credited with the ability to produce and comprehend metaphors can distinguish literal from nonliteral similarity, rather than whether he or she can merely distinguish meaningful comparisons from anomalous ones, or whether he or she has a complete understanding of hierarchical ordering and class inclusion relations.

The experiment we conducted was designed as a first step towards exploring children's distinctions between literal, metaphorical, and anomalous comparisons. It should be stressed that we were interested, in this part of the investigation, in examining children's conceptions of similarity as they relate to the understanding of verbal metaphor. Thus, the task we used was a verbal one that probed children's conceptions of similarity based on their representations of objects in memory.

In the experiment children and adults were asked to verbally complete statements of the form "A is like . . .," such as "A river is like a . . ." choosing one of two words. This task will be referred to as the comparison task. Each A term (e.g., river) in these incomplete similarity statements appeared in combination with three word pairs each of which resulted in different types of comparisons: First, a metaphorical/literal word pair (hereafter the M/L pair type) was used which resulted either in a metaphorical or a literal comparison. For example, given river as the A term, a child would have to choose between snake and lake to complete the similarity statement. The second type of word pair was a literal/anomalous word pair (hereafter an L/A pair type) resulting either in a literal or an anomalous comparison. In this case a child would have to choose between lake and cat. Finally, a metaphorical/anomalous word pair (hereafter an M/A pair type) was used. This resulted either in a metaphorical or an anomalous comparison, so that, again, given river as the A term, a child would have to choose between snake and cat.

It was assumed that the selection of literal and metaphorical comparisons over anomalous ones in the L/A and M/A pair types respectively would justify attributing to the children the ability to distinguish meaningful similarity statements from anomalous ones. In particular, a preference for metaphorical over anomalous comparisons would be evidence that the child recognized some similarity in the metaphorical case. It was further assumed that the selection of the literal over the metaphorical comparison in the L/M pair type would be evidence that the children perceived the terms in the literal comparisons to be more similar than those in the metaphorical comparisons.

Since the recognition of a metaphorical statement as metaphorical usually requires the realization that conventional category boundaries are being transgressed, it was also necessary to determine how subjects viewed the categorical relationships within the items. For this reason, another group of children and adults received instructions to complete statements in which the word "like" was substituted by "the same kind of thing as." In this categorization task the literal choices clearly become the correct ones and the metaphorical ones become inappropriate, something that is not true in the comparison task. For example, while both lake and snake may be equally acceptable choices to complete the sentence, "A river is like a . . .," only lake is a suitable completion for "A river is the same kind of thing as a . . ." Thus, manipulating the task in this way enabled us to check that subjects doing the comparison task could be expected to possess the conventional categories whose violations were involved in the metaphorical comparisons.

Method

Subjects. The subjects were 20 3 year olds (mean age 3:7), 20 4 year olds (4:7), 20 5 year olds (5:6), 20 6 year olds (6:6), and 20 adults (undergraduate students). In each group approximately half of the children were boys and half were girls.

Materials. Ten nouns referring to concrete objects were used as A terms. Each A term had three B terms (B_L, B_M and B_A) associated with it, such that when appearing in a similarity statement, A paired with B_L gave rise to a literal comparison, A paired with B_M gave rise to a metaphorical comparison, and A paired with B_A gave rise to an anomalous comparison. The nouns used as A and B terms are listed in Table 1.

Insert Table 1 about here.

Each statement consisted of an A term and a pair of its associated B terms, B_M and B_L, B_L and B_A, and B_M and B_A. Thus, there were three pair types of B terms associated with each A term, an M/L pair, an L/A pair, and an M/A pair, making a total of 30 statements. On each trial a subject would select one of the two B terms with which he was presented. Subjects in the comparison task received all 30 statements. The 10 statements involving the M/A pair type were, however, dropped in the categorization task because both alternatives resulted in inappropriate choices. Thus subjects in the categorization task received only 20 statements. Each subject received a different random order of statements.

Most of the metaphorical alternatives were selected from records of children's spontaneous metaphor (e.g., Chukovsky, 1968; Koch, 1970), and focussed on perceptual similarity between the two terms. The literal alternatives involved objects from the same category as the A term. In the anomalous alternatives the terms were chosen so as to minimize any obvious shared attributes.

To confirm our intuitions about the relative degree of similarity between the different comparison types all the similarity statements were rated by 15 adult judges on a scale from 1 to 6. For each item the mean similarity rating for the two terms was always higher for the literal comparison that for the corresponding metaphorical comparison, which in turn was always higher than for the corresponding anomalous comparison. Overall, the mean judged similarity was 4.6 for the literal comparisons, 3.3 for the metaphorical comparisons, and 1.1 for the anomalies. These

similarity levels are consistent with other data (as yet unpublished) being collected in our lab.

Procedure

Subjects were randomly assigned to one of the two tasks, and tested individually. In the comparison task they were asked to say whether "A is like B or C," while in the categorization task were asked to say whether "A is the same kind of thing as B or C." Before indicating their selection subjects were asked to repeat B and C to make sure that they remembered and took into consideration both items. At the end of the experimental session the subjects were asked to justify their last five choices.

Prior to participating in the experiment all the children were given a pretest of their comprehension of the relations "like" and "same kind of thing." They were shown three toys--a red truck, a yellow van, and a white kitchen stove. Children in the comparison task were asked to indicate both which items were "like" each other and which was "different" from the others. Since the purpose of the study was to determine whether young children could distinguish literal from metaphorical similarity, the pretest only attempted to check that children understood "like" in the context of literal similarity. Children in the categorization task were asked to indicate which items were "the same kind of thing" and which was "a different kind of thing." Two 3 year olds failed to pass this pretest and were excluded from the experiment. The whole experimental session lasted approximately 30 minutes, and was tape-recorded.

Results

First each subject was given a score based on the number of his or her literal responses in the M/L and L/A pair types in the comparison and categorization tasks. The mean number of these literal responses in the two tasks for each age group appears in Table 2. A 5 (Age) x 2 (Task) x 2 (Pair Type) analysis of variance on the literal responses showed main effects for all the variables. The main effect for Age, $F(4,90) = 21.05$,

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Insert Table 2 about here.

$p < .001$, was due to an overall increase in the number of literal responses with age. The main effect for Task, $F(1,90) = 51.48$, $p < .001$, was a result of the greater number of literal responses in the categorization task than in the comparison task, and the main effect for Pair Type, $F(1,90) = 203.02$, $p < .001$ was due to the greater number of literal responses in the L/A pairs than the M/L pairs. There was also a significant Age x Task interaction, $F(4,90) = 6.40$, $p < .001$, a significant Task x Pair Type interaction, $F(1,90) = 57.54$, $p < .001$, and a significant Age x Task x Pair Type interaction, $F(3,90) = 4.069$, $p < .005$. The Age x Task interaction was due to the greater increase by age in the number of literal responses in the categorization task than the comparison task. The Task x Pair Type interaction was the result of the greater number of literal responses for the L/A pair type than the M/L pair type in the comparison task but not in the categorization task. Finally, the Age x Task x Pair Type interaction was due to the lack of an increase with age in the number of literal responses for the M/L pairs in the comparison task.

The second part of the analysis involved giving each subject in the comparison task another score on the basis of the number of his or her metaphorical responses in the M/L and M/A pair types. The mean number of these metaphorical responses appears also in Table 2. There, of course, the responses in the M/L column represent the same data as those from the literal responses. A 5 (Age) x 2 (Pair Type) analysis of variance on the metaphorical responses in the comparison task showed a main effect for Pair Type, $F(1,45) = 84.83$, $p < .01$, and an interaction between Age x Pair Type, $F(4,45) = 2.59$, $p < .05$. The main effect for Pair Type was due to a greater number of metaphorical responses in the M/A pairs than the M/L pairs. The Age x Pair Type interaction was due to an increase with age in the number of metaphorical responses in the M/A pairs but not in the M/L pairs. In this latter case there was no preference for either the metaphorical or the literal comparison for all age groups.

Using a t test for single means, each mean for all pair types in both tasks was compared against the probability that it occurred by chance (.50). As can be seen in Table 2, children of 4 years and older chose the literal and metaphorical alternatives over the anomalous ones in the L/A and M/A pairs in both tasks, and they chose the literal over the metaphorical alternatives in the M/L pairs in the categorization task. The 3 year olds also rejected the anomalies in the comparison task, but failed to choose the literal over the metaphorical alternatives in the categorization task.

Discussion

The first important finding was that in both tasks the children, even the youngest ones, showed a clear preference for meaningful

comparisons over anomalous ones. This preference was evidenced by their rejection of the anomalous alternatives in both the L/A and the M/A pair types. Of course, as the main effect for age and the different interactions involving age in both analyses of variance show, the older children did better at rejecting anomalous comparisons than the younger children. However, even the 3 year olds rejected anomalies, for the most part, significantly more often than predicted by chance. It should be mentioned here that the 3 year olds had some difficulty with a few specific items, especially those in which the objects belonged to the same category but did not share many perceptual properties. For example, they consistently chose the anomalous comparison "eyes are like a bicycle" (presumably because eyes are round and bicycle wheels are round), over the literal comparison "eyes are like ears." Such preferences suggest either that younger children do not have the conventional category well established (in this case, one that might be called "facial features"), or, that if they have it, that they also possess a more salient nonconventional category (e.g., "circular things"). However, the point remains that the overall rejection of anomalies suggests that even 3 year old children can distinguish a meaningful comparison from an anomalous one.

The second important finding involves the M/L pair type. As the Age x Task x Pair Type interaction showed, an increase with age in the number of literal responses for the M/L pair type occurred only in the categorization task, and not in the comparison task. The lack of preference for the literal alternatives in the M/L word pairs in the comparison task was interesting. It vitiates against any developmental account that proposes that children first understand "real" (i.e., literal) similarity and only

later, based on that, metaphorical similarity. Such an account would predict that the young children would always choose the literal alternatives, with no-preference only showing up later. In fact, the data shows no-preference responses at all ages. None of the groups selected literal or metaphorical completions significantly more often than chance. In other words, the 3 year olds, like adults, treat metaphorical similarity statements as bona fide similarity statements. Thus the crucial result in the comparison task is the universal rejection of anomalies.

It might still be argued that at least the adult subjects should have preferred the literal over the metaphorical pairs, especially since the adult ratings for the corresponding comparisons indicated that their perceived similarity was greater. This lack of preference can be explained if it is assumed that subjects, realizing that both alternatives were "correct," employed one of several alternative strategies to resolve their dilemma. Inspection of the protocols showed that most adults and older children were quite systematic, some choosing predominately metaphorical comparisons, others making primarily literal selections instead.

An increase with age in the number of literal responses in the M/L pair types did occur in the categorization task, where, in contrast to the comparison task, the literal alternative was clearly the correct choice. This difference between the two tasks accounts for the interactions between age and task, age and pair type, and age, task and pair type obtained in the analysis of variance on the literal responses. The fact that in the categorization task all children except the 3 year olds selected the literal over the metaphorical alternatives significantly more than chance would predict is important. It suggests that these

children realized that the terms involved in the metaphorical pairings belonged to different conventional categories.

It could be objected that the children who selected the literal alternatives in the categorization task were doing so because they selected high associates and not because they knew that the two terms belonged to the same category. While it is true that terms from the same category are likely to be highly associated, the fact that children of the same age did not choose the high associate in the comparison task argues against using association to account for their responses in (only) the categorization task. It is more parsimonious to assume that the children who were 4 years and older chose words that belonged to the same category.

The 3 year old children showed no evidence of distinguishing the literal from the metaphorical alternatives in the M/L word pairs. Unlike the older children, their selections for this pair type did not differ in the two tasks. Regardless of task, the young children clearly did prefer the literal over the metaphorical selections for particular items; for example, over 70% of the 3 year old children selected the literal pairings "sugar/honey" and "rain/snow" over their metaphorical alternative ("sugar/snow," and "rain/tears"). With other items the metaphorical pairing was preferred. Ninety-five percent of the 3 year olds selected "ears/pancakes," and 75% of them chose "sun/orange" and "moon/cookie." Still, for the majority of the items there was no clear preference for either of the alternatives.

The 3 year old children's failure to distinguish literal from metaphorical alternatives in the categorization task is probably not attributable to total ignorance about the class-defining properties of the

referents of the words used in the experiment. The children provided adequate information when they were asked to say what they knew about the objects compared. But, as other investigators of early child language have noticed (Bowerman, 1978; Nelson, 1978), they did not seem to have this information well organized in terms of the relative importance of the different attributes. Evidence for this was provided in the explanations of their choices in both tasks. For example, perceptual similarity, especially similarity in shape, was often the critical dimension on which both categorization and similarity judgements were based. This dimension has often been cited as a potent determinant of children's similarity judgements (Gardner, Winner, Bechhofer & Wolf, 1978; Winner, et al., 1980). At other times choices appeared to be based on attributes that, from an adult perspective, seemed to be relatively unimportant (e.g., eyes are like a bicycle because they are both blue). Sometimes a judgement was based on an important attribute of the first object but a relatively unimportant attribute of the second object (e.g., the moon is the same kind of thing as a shoe because the moon is round and a shoe's heel is round). Sometimes an important attribute cited for the first object seemed not to be an attribute of the second object at all (e.g., a river is the same kind of thing as a cat because a river has water, the sun is like a chair because the sun is round), and finally sometimes the child provided no substantive justification whatever (e.g., clouds are like ice cream because I like ice cream).

Although traces of these types of reasoning were also found in the 4 year old group, children of that age showed that they could reason about their choices in ways much more similar to those of adults. They could

easily focus on the important attributes that the two objects shared and as a result produced many more literal responses, especially in the categorization task (e.g., a river is the same kind of thing as a lake because there is water in both of them, a leg is the same kind of thing as an arm because they are parts of the body, etc.).

Although neither task alone has anything to say about the emergence of the literal/metaphorical distinction, taken together, they provide a basis for attributing some metaphoric competence to the 4 year old child. First, the results of the comparison task showed that all children, even the 3 year olds, distinguish between two kinds of similarity statements, those that make sense (i.e., literal and metaphorical) and those that do not (i.e., anomalous). Further, the results of the categorization task showed that after about 4 years of age, children are aware that the terms in such statements belong to different conventional categories. Since the subjects for both tasks were drawn from the same population and were tested with the same materials it is reasonable to assume that 4 year olds both prefer metaphorical to anomalous comparisons and are aware that the terms involved in metaphorical comparisons do not belong to the same conventional category, while those in literal comparisons do. It is on this basis that we are willing to attribute some metaphorical competence to them. In other words, it appears that by 3 years of age children see only undifferentiated similarity, distinguishing that from anomaly, while by 4 they also know that some meaningful similarity statements compare terms from the same conventional category, while other meaningful comparisons involve terms from different categories.

The failure of the 3 year old children to distinguish literal from metaphorical similarity statements in the categorization task is compatible with the possibility, raised in the introduction, that the young child's renamings might be based merely on the perception of undifferentiated similarity rather than on metaphorical similarity. However, further investigation would be needed to resolve this question. It is possible that the 3 year olds, and maybe even younger children, could distinguish between literal and metaphorical comparisons in those cases in which they were very familiar with the items compared, or in which the items in the literal comparisons shared many properties of a physical/perceptual nature. It is also possible that the younger children could do better in tasks involving the use of context, and, of course, in non-verbal tasks that tap perceptual and functional similarity. If this should turn out to be the case, the possibility that the renamings of children younger than 4 are metaphorical in nature would again become viable.

While the present results suggest that one should be cautious about attributing metaphorical competence to very young children (sometimes even younger than 2 years old) who engage in renaming, they also argue against the other extreme, whereby such competence is denied to children prior to the stage of concrete operations. The finding that by 4 years of age children appear to be able to distinguish meaningful comparisons that are literal from those that are metaphorical suggests that they have their knowledge adequately organized to understand when the terms in a meaningful comparison belong to different conventional categories, and that, therefore, they have at least one important prerequisite for metaphor production and comprehension. However, we say "one important prerequisite"

advisedly. The metaphorical comparisons used in this study, as well as the "so-called" child metaphors usually encountered in the literature, differ from adult metaphors in certain important respects. First, they rely almost exclusively on perceptual similarity (and, occassionally, on similarity between the actions associated with the compared objects). This is not an accidental phenomenon. The perceptual properties of objects are very salient for children--in many cases they almost exhaust their knowledge of objects. For adults, however, perceptual predicates, while not representing trivial properties of objects, are less central than other kinds of predicates such as those having to do with causal and structural relations, functional attributes, etc. (see Carbonell, 1981 for an interesting discussion of the relative importance of different kinds of conceptual relations). For example, knowledge of the sort that the sun is an astronomical object, the center of the solar system, a source of heat, light and energy, is much more central to the concept of "sun" for an adult than the perceptual information that it appears to the eye as a disc and that it has an orange color. In contrast, the perceptual information is what the young child mostly knows about the sun and what the child consequently regards as important. This difference in adult-child knowledge is probably the main reason why child metaphors appear from an adult perspective to be relatively impoverished.

A second, related, difference between adult metaphors and child metaphors is that child metaphors tend to lack salience imbalance. Typically, adult metaphorical comparisons such as Lectures are like sleeping pills depend on predicates that are highly salient (conceptually central) for the B term being less salient for the A term--inducing sleep

is more central to the concept of sleeping pills than it is to the concept of lectures. Metaphorical comparisons which rely exclusively on perceptual or descriptive properties have little, if any, salience imbalance both for children and for adults, although for different reasons. First, if there is to be sufficient differentiation of salience levels there needs to be a rather rich knowledge representation, which the young child might well lack. Children know relatively little about objects in general, so what they do know tends to be highly salient. There is, as it were, insufficient room in the schemas of a young child to permit any significant degree of salience imbalance. In this sense, the young child's appreciation of metaphors (both in production and in comprehension) is likely to be rather limited. Second, for the adult, perceptual properties tend to be subordinate to more abstract properties, regardless of the object. Thus, when two objects are metaphorically similar, salience imbalance for perceptual attributes is unlikely.

To the extent that they lack much salience imbalance, metaphorical comparisons will not exhibit the asymmetries ordinarily characteristic of them (Ortony, 1979). Thus, while Sleeping pills are like lectures is very odd in comparison to Lectures are like sleeping pills, Pancakes are like ears is not much worse that Ears are like pancakes! It does seem to be the case that the kinds of metaphors children produce and understand tend not to undergo significant meaning changes when reversed, although syntactic constraints make some of them sound awkward when reversed.

In conclusion, we speculate that children start with an undifferentiated notion of similarity which at about the age of 4 becomes differentiated into literal and nonliteral similarity. Then, as children gain

more experience of the world the richness of their knowledge begins to permit the production and comprehension of nonliteral comparisons which do not rely solely on descriptive properties of objects but on properties of a more abstract and relational nature. This knowledge in turn allows for comparisons between objects whose schemata permit more differentiated salience levels of their constituents and thus, a more sophisticated appreciation of metaphor.

Reference Note

1. Carbonell, J. G. Metaphor: An inescapable phenomenon in natural language comprehension (Tech. Rep. No. CMU-CS-81-115). Carnegie-Mellon University, Department of Computer Science, May 1981.

References

Billow, R. M. Observing spontaneous metaphor in children. Journal of Experimental Child Psychology, in press.

Bowerman, M. The acquisition of word meaning: An investigation of some current conflicts. In N. Waterson & C. Snow (Eds.), Development of communication: Social and pragmatic factors in language acquisition. New York: Wiley, 1978.

Chukovsky, K. From two to five. Berkeley: University of California Press, 1968.

Cometa, M. S., & Eson, M. E. Logical operations and metaphor interpretation: A Piagetian model. Child Development, 1978, 49, 649-659.

Gardner, H., Winner E., Bechhofer, R., & Wolf, D. The development of figurative language. In K. Nelson (Ed.), Children's language. New York: Gardner Press, 1978.

Koch, R. Wishing, lies, and dreams. New York: Chelsea House, 1970.

Nelson, K. Semantic development and the development of semantic memory. In K. Nelson (Ed.), Children's language. New York: Gardner Press, 1976

Ortony, A. Beyond literal similarity. Psychological Review, 1979, 86, 161-180.

Piaget, J. Play, dreams and imitation in childhood. New York: Norton, 1962.

Sternberg, R. J., Tourangeau, R., & Nigro, G. Metaphor, induction, and social policy: The convergence of macroscopic and microscopic views. In A. Ortony (Ed.), Metaphor and thought. New York: Cambridge University Press, 1979.

Tourangeau, R., & Sternberg, R. J. Understanding and appreciating metaphors. Cognition, in press.

Winner, E., McCarthy, M., & Gardner, H. The ontogenesis of metaphor. In R. P. Honeck & R. R. Hoffman (Eds.), Cognition and figurative language. New Jersey: Erlbaum, 1980.

Winner, E., McCarthy, M., Kleiman, S., & Gardner, H. First metaphors. In D. Wolf, & H. Gardner (Eds.), Early symbolization: New directions for child development, Vol. 3. San Francisco: Tossey-Bass, in press.

Table 1

Nouns Used as A Terms and B Terms

in the Comparison and Categorization Tasks

A Terms	B Terms		
	Literal Alternative	Metaphorical Alternative	Anomalous Alternative
rain	snow	tears	dog
eyes	ears	buttons	bicycle
clouds	fog	ice-cream	table
moon	star	cookie	shoe
sugar	honey	snow	road
river	lake	snake	cat
sun	moon	orange	chair
leg	arm	stick	wall
ears	eyes	pancakes	truck
nose	mouth	mountain	bed

Table 2

Mean Number of Literal Responses in the Two Tasks (Out of 10)

Age	Comparison Task		Categorization Task	
	M/L Pair Type	L/A Pair Type	M/L Pair Type	L/A Pair Type
3	4.2	7.1*	3.9	6.3
4	4.6	8.1*	7.0*	8.8*
5	4.1	8.8*	8.8*	9.6*
6	5.9	9.2*	8.8*	9.8*
Adult	5.1	10.0*	9.5*	10.0*

Mean Number of Metaphorical Responses

in the Comparison Task

Age	M/L Pair Type	M/A Pair Type
3	5.8	7.0*
4	5.4	8.9*
5	5.9	8.8*
6	4.1	9.4*
Adult	4.9	9.4*

*Significant above chance, $p < .05$